IN THE DRAWINGS:

Please amend FIG. 1, by adding section line 4-4 over the housing 26 as shown in the enclosed copy of FIG. 1, on page 1 of the drawing sheets, which page is marked "REPLACEMENT SHEET."

Please add a new enlarged, partial sectional view as FIG. 4, as shown in the enclosed copy of page 1 of the drawing sheets, which page is marked "REPLACEMENT SHEET."

REMARKS

Claims 1 – 15 and 17 – 21 are presently pending. In the above-identified Office Action, the Examiner rejected Claim 19 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 3, 5, 6, 7, 8, 9, 18 and 19 were rejected under 35 U.S.C. 102(b) as being anticipated by Schwanz *et al.* (US 4,227,426, hereinafter 'Schwanz'). Claims 1 – 9, 18 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi (US 5,636,549, hereinafter 'Devenyi'). Claims 10 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi and further in view of Pan (US 6,459,844, hereinafter 'Pan'). Claims 12 – 15, 17, 20 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi and further in view of Pan. Claims 1 – 15 and 17 – 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Pan in view of Schwanz and further in view of Devenyi.

Claims 5 – 7, 13, 16, 20 and 21 have been canceled and independent Claims 1 and 12 have been amended, so that Claims 1 – 4, 8 – 12, 14, 15 and 17 – 19 are now presented for reconsideration. Editorial amendments have been made to the dependent claims. A new Figure, FIG. 4, has been added to the drawings as an aid to help the Examiner understand the structure of the spring pin 54 and how the spring pin functions when assembled to the housing 26. The addition of new Figure 4 does not add any new matter to the Application because the various portions of the spring pin 54 and the assembly of the spring pin to the housing 26 are fully described in specification paragraphs 0021 and 0022. Please note that the words 'arc' and 'bent' are used in relation to the spring pin 54 in paragraphs 0020, 0021, 0022 and 0023; the words 'retainer' and 'opening' are used in relation to the housing 26 in paragraph 0021; and the words 'preload,' 'bending force' and 'springy engagement' are used in relation to the spring pin assembled to the housing in paragraphs 0021 and 0022.

For the reasons set forth more fully below, the subject Application is deemed to properly present claims patentable over the prior art. Reconsideration, allowance and passage to issue are respectfully requested.

The rejection of Claim 19 under section 112 is respectfully traversed. Claim 19, after amendment, recites: "the spring pin is biased toward the thread wire to ensure a positive contact between the spring pin and the thread wire." The Examiner states in paragraph 2 of the Office Action that "it is unclear ... how the spring pin is 'preloaded'? Or does the preloading of the spring happen when the spring is in contact with the wire prior to activation of the leadscrew?"

The short answer is that the spring pin is preloaded when the central portion of the spring is bent and the ends of the spring are inserted into the wall openings of the housing 26 during assembly of the spring to the housing. The bending of the central portion and the capture of the ends cause a downward biasing force of the spring against the thread wire, which may best be appreciated by reference to new Figure 4, an enlarged, partial sectional view taken along line 4 – 4 of Figure 1.

The longer answer to the Examiner's question about the 'preload' is that the spring pin 54 is assembled to the housing 26 by bending the spring pin 54 and placing the spring pin's two ends 56 and 60 into the wall openings/retainers 62 and 64, respectively, of the housing 26, so that the central portion 58 of the pin 54 is disposed in an arc or curve. The advanced loading of the spring pin occurs when the spring is bent. The spring has a memory that tends to bias the spring to its initial equilibrium position, i.e., a linear disposition) when the ends 56, 60 become restrained or captured in the wall openings 62 and 64, respectively, of the housing 26. High school physics informs that the memory in the spring will cause vector forces to be induced outwardly and upwardly in the ends 56 and 60 of the spring 54 as the spring attempts to straighten itself; however, because the spring ends are captured by the housing, these forces cause the ends 56,60 to bear against the walls of the openings 62, 64 so as to restrain the position of the spring by friction generated between the walls of the openings and the spring ends.

Meanwhile, the central portion 58 of the spring 54, also tries to return to an equilibrium linear position, but cannot do so because the ends 56, 60 of the spring are restrained in the openings 62, 64 of the housing. The result is that the memory in the central portion 58 of the spring 54 will induce a biasing force in the central portion 58 acting in a downward direction when viewed in FIGS. 2 – 4. The downwardly acting biasing force of the central portion 58 of the spring 54 will be directed against the thread

wire 46 of the leadscrew 44. It is this biasing force that is created during assembly of the spring to the housing which is called the 'preload' in paragraph 0022 of the specification.

The present invention addresses the need in the art for a simple and inexpensive motion transmission device that translates rotary motion to linear motion for light duty, low loads and/or low speeds. The invention is tolerant of misalignments during assembly and avoids backlash and play because of a preload of the spring on the thread wire. The invention is ideal for small size applications but is easily scaled over a wide range of sizes. The structure of the invention results in only the wire thread around the shaft and the spring wire of the pin making contact. Hence, only those elements need be made of a hard and more costly material, such as spring steel. Hence, wear of these two elements is relatively small.

The invention is addressed in claims of varying scope of which amended Claim 1 is illustrative. Claim 1 recites:

> 1. A motion transmission apparatus comprising:
> an elongated shaft having an outer surface;
> a thread wire helically wrapped in spaced-apart turns upon the outer surface of the shaft;
> a housing having an unthreaded bore for receiving the wire wrapped shaft and for enabling relative rotation between the shaft and the housing, the housing including wire receiving openings; and
> **a spring wire having first and second ends and an arc-shaped central portion, the first and second ends being received by and retained in the openings of the housing, and the central portion for engaging and biasing the wrapped thread wire.** (Emphasis added.)

None of the cited references teach, disclose or make unpatentable the invention as presently claimed. That is, none of the references, taken alone or in combination, teach, disclose or even suggest a motion transmission apparatus including **a spring wire having first and second ends and an arc-shaped or curved central portion;** none of the references, taken alone or in combination, teach, disclose or suggest that **the first and second ends are received by and retained in the openings of the housing;** and none of the references, taken alone or in combination, teach, disclose or suggest that **the central portion engages and biases the wrapped thread wire.**

With regard to the section 102 rejection, Schwanz, the only cited reference, discloses a U-shaped spring clip 7 having arms 8 and 9 engaged to the shaft 6 at the mid-sections of arms. The mid-section of arm 8 also engages the coil 3. The "ends" of the clip extend laterally to the left in Fig. 2 of Schwanz, and these ends are not received by anything. They are 'free standing.' The curved bottom of the U-shape extends out to the right in Fig. 2, and this bottom portion does not engage or bias anything. The clip 7 functions by having the arms spread apart when being assembled and disassembled to the shaft 6, but there is nothing shown nor is there any teaching that the clip is in any way stressed when in the assembled position shown in Fig. 2. The clip would assume the same attitude shown in Fig. 2, if removed from the shaft and placed on a surface in an equilibrium position. Hence, the clip 7 has a structure that is different from the Applicant's spring pin, the clip 7 is used differently from Applicant's spring pin and the clip when assembled is different from Applicant's spring pin.

The Examiner states that the clip 7 "has a first end (near 8), a second end (near 9) and central portion (running between the two ends)" and that "the ends (near 8, 9) are affixed to the ...housing (the ends go around the housing, see Figure 2.)" See Office Action, page 3, lines 12-18. This recitation is imprecise (where is 'near 8'?) and is not consistent with the common definition of 'end,' namely, a location that marks the extent of something. The clip's 'extents' are off on their own and are not received by anything. The Examiner, however, places the ends at midsections of each of the arms 8, 9. In contrast, Applicant uses and identifies ends 56, 60 of the spring pin 54 in the specification and in the drawings in a traditional fashion.

The Examiner also states that Schwanz has a central portion "at 8 (that) spans an arc to engage the thread, see Figure 2." See Office Action, page 10, lines 14 – 17. The Examiner has the arm 8 of the clip 7 doing double duty, first, as an "end" affixed to the shaft and again as a central portion engaging the coil 3. This, of course, is improper. Secondly, Claim 12 recites that the central portion of the spring extends "in an arc." It is clear from inspection of Figure 2 that the arm 8 of the clip is not arc-shaped or curved, and there is no teaching of such a structure in the Schwanz specification.

Finally, the Examiner states that the clip 7 "is preloaded (in contact with thread) to ensure positive contact between" the clip and the thread. See Office Action, page 4,

lines 15 – 17. The word 'preload' means the application of a force beforehand. Nowhere, however, is there any teaching in Schwanz that the clip applies any kind of loading or force, in advance or otherwise.

In summary, the clip 7 disclosed by Schwanz does not have the same structure as the spring pin 54 disclosed in the Application, the clip does not get assembled in the same way as the spring pin, and the clip, when fully assembled, does not function in the same way as the spring pin.

The shortcomings of Schwarz are not overcome by the teachings of the other two cited references, Devenyi and Pan, and therefore, the rejections under section 103 cannot stand because even if all of the cited references are combined, not all of the limitations of the Claims are set forth.

Accordingly, Applicant respectfully submits that the Claims should be allowable. Reconsideration, allowance and passage to issue are therefore respectfully requested.

Respectfully submitted,
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